APPENDIX 5.1.2.1

PORTKIT INPUT-OUTPUT MODELING

1.0 INTRODUCTION

The South Carolina State Port Authority (SCSPA) periodically conducts studies in order to assess its economic impact upon the region and the state. The SCSPA uses the Port Economic Impact Kit (PortKit) developed for the Maritime Administration (MARAD) of the U.S. Department of Transportation. The PortKit is a 30-sector input-output (I-O) economic model designed to capture how ports affect the local and state economies. The kit, customized to be region-specific, allows ports to quantify their contributions to the regional and state economies by producing measures of sales revenues, employment, personal income, and state and local tax impacts. These measures serve to provide a value to the vital commercial link that exists between a port and the businesses it serves. The first study was conducted in the Spring of 1988 and analyzed the port impacts based upon 1987 cargo activities. PortKit I-O studies were conducted again for the years 1990, 1994, and 1997.

The 1997 PortKit I-O study was conducted by Mercer Management Corporation on behalf of the SCSPA . (South Carolina State Ports Authority, "1997 Economic Impact Study," October 1998.) The results of the 1997 study are discussed in Section 4.2.1.2.

The PortKit I-O model is also used to assess the economic impacts for the No Action and Action alternatives for this EIS. The SCSPA utilizes cargo projections cited in the Mercer Report as the primary predicator of future port activities and as the input data for the EIS I-O study. The Mercer Report cited container projections from the years 1998 to 2017. Cargo projections are extrapolated for the years 2018 to 2020 in order to conform to the EIS time period of 2000 to 2020. This effort produced sales, employment, income, and tax revenue projections by five-year increments starting with the year 2000. These projections are discussed in Section 5.1.2.1 for the No Action Alternative and Section 5.2.2 for the Proposed Project. It is assumed that the economic and population impacts predicted by the PortKit I-O model would be the same for any of the Action Alternatives as are projected for the Proposed Project.

The PortKit I-O model analyzes three separate areas: the port industry, the port users, and the impact from capital expenditures by the SCSPA. It is important to note that the study excluded money which left the state, i. e. income of out-of-state businesses and corporations. The elimination of money traveling out of state known as "leakage"--greatly enhanced the accuracy of the study by focusing only on that money earned and spent within the state borders. Furthermore, by eliminating this money early in the processing phase, the figures and amounts expressed in the combined indirect and induced statistics are far more accurate.

2.0 EXPLANATION OF TERMS

The following terms are used in this EIS and are consistent with the guidelines of the MARAD PortKit.

Commercial and Operational Classifications of Impact

Port Users -shippers or receivers engaged in international or waterborne commerce during the calendar year under study, who shipped or received cargo through the SCSPA. Examples include major users such as BMW, Amoco, and Michelin and importers and exporters located in South Carolina.

Port Industry- maritime industry engaged in activities essential to moving cargo through South Carolina ports.

Capital Expenditures -money spent by the SCSPA for construction and upgrading of the SCSPA facilities.

Types of Economic Impact

Direct Impact- the effect of initial earnings produced and employment generated by port users, port industries and capital expenditures. (E.g., merchandise sold by a port user firm, stevedores earning wages from the company with which they are employed, the dollar cost of rehabilitating a warehouse at a port terminal.)

Indirect Impact- the effect on other industrial and service sectors resulting from the direct impact of port activity. This includes the inter-industry economic activity supported by the purchases of supplies, services, labor, and other resources. These activities may or may not deal directly with the SCSPA Authority in the conduct of business, but these business activities are stimulated in part by port industry's or port user's initial round of expenditures. (E.g., paper supplies purchased for business operations at a steamship agency or petroleum products purchased to operate and maintain a port user's vehicle fleet.)

Induced Impact- the economic effects that result from household purchases of goods and services made possible because of income generated by the direct and indirect economic impacts of the SCSPA. (E.g., the use of take-home pay to buy groceries, pay rent, or entertain family and guests.)

Measurements of Economic Impact

Employment- the number of people employed attributable to port activities.

Sales- the value of a firm's revenues or output attributable to port activities.

Income- the value of state and local wages paid to employees attributable to port activities.

Taxes -the value of state and local taxes (including sales, property, and income taxes) collected and attributable to port activities.

3.0 GENERAL APPROACH OF THE PORTKIT INPUT-OUTPUT MODEL

3.1 Overview

The basic approach for carrying out a port economic I-O impact study consists of the four steps outlined below. Each step is explained in more detail in the following sections.

1. Step One: Data Collection and Surveying
   a. Determining the local county and city economic and demographic inputs.
   b. Determining the port user direct employment.
   c. Determining the port industry direct sales revenues by examining cargo flow impact.
   d. Determining the capital spending direct sales revenues.
2. Step Two: Run the Input-Output Model
3. Step Three: Determine Direct, Induced and Indirect Impacts of SCSPA Operations.
4. Step Four: Summarize and Report the I-O Study Results.

3.2 Data Collection

In preparation for impact studies, the SCSPA business analyst and several part-time students collect data required to run PortKit, using the detailed survey approach. On average, this process takes up to eight months to complete. From this effort, timely vessel expenditure costs, state and local taxes, personal

income, commuting patterns, employment and earnings by industrial classification, port user firms' direct employment, and capital spending input values are collected.

3.2.1 Local City and County Economic and Demographic Inputs

The PortKit model requires the user to collect and input various economic and demographic indicators in order to adjust the model for the local, regional, and state characteristics. The SCSPA collects data concerning state and local taxes, personal income, commuting patterns, employment and earnings by industrial classification, and the percentage of state residents working for companies located in South Carolina. When necessary, appropriate growth rates formulas are applied to BEA and Census data, bringing this data in conformance with the time frame of study

3.2.2 Port Users

Port users include South Carolina shippers or receivers engaged in international shipping who ship or receive cargo through the SCSPA facilities. Some examples of port users include pulp mills shipping woodpulp to foreign manufactures, manufacturers receiving components used in the production of their products, and heavy equipment manufacturers exporting construction machinery to foreign markets. In May 1998, under Mercer's direction, the SCSPA conducted a mail survey of statewide port users and port industry firms in order to develop required employment statistics by industry sector which is used in the EIS I-O model.

3.2.3 Port Industry

The impact of port industries requires the development of cost-per- cargo ton figures to determine the direct sales impact of all three South Carolina ports. Per unit cost figures are determined for containers (TEUs), breakbulk, and roll-on freight. The resulting values represented the interstate income a port industry firm earned by moving one ton of a customer's cargo through the South Carolina's ports.

The following is a list of the twelve industry categories:

- South Carolina State Ports Authority
- Stevedores, Clerks, and Checkers, Longshoremen
- Transportation (truck lines, railways, barges)
- Freight Forwarders and Customs House Brokers
- Navigation (to include pilots, linehandlers, and container repair)
- Steamship Agents
- International Banking
- Warehousing
- Fuel Bunkering
- Maritime Association (sets rules for commercial use of a harbor)
- Maritime Suppliers
- Marine Insurance Underwriters

Once the data was assembled, the cost-per ton value was derived. The resulting figures constituted the basis for calculating the direct impact of the port industry on the state economy. By multiplying the cost-per-ton value with the gross tonnage for cargo, the dollar value was obtained.

Cost per Ton X Total Cargo Tonnage = Direct Sales Impact

This amount represents the actual dollar revenue earned by the port industry for moving cargo through the South Carolina port system.

3.2.4 Port Capital Expenditures

Port capital expenditures are the funds spent by the SCSPA for the construction and upgrading of its facilities. These estimates include the cost of paving, the construction and repair of buildings and piers, the purchase of land and equipment, and the cost of dredging. These costs and purchases are proportioned between what is purchased locally, within the State of South Carolina, and out-of-state. For the EIS I-O model, the SCSPA used capital expenditure projections supplied by Mercer Management in order to derive the projected expenditures for the No Action and Proposed Project alternatives.

3.3 Run the Input-Output Model

The PortKit I-O model is an interactive microcomputer model. All data and survey information work must be collected and formatted properly before the model is run. The I-O model uses six rounds of spending to determine the new sales revenues generated and the regional purchase coefficient.

3.4 Determining the Direct, Indirect and Induced Impacts

The direct, indirect and induced impacts of all three direct impacts resulting from port industry, port users, and port capital expenditures are estimated. The use of multiples derived from the I-O model is the most widely accepted means of indicating the broad linkages of an activity throughout a local economy. The economic multipliers are region-specific in value and represent the ratio between the total impact and the direct impact.

3.5 Summarizing and Reporting the EIS PortKit I-O Model Results

The results of the 1997 I-O study are discussed in Section 4.2.1.2. The results of the EIS PortKit I-O model are summarized in Section 5.1.2.2 for the No Action Alternative and Section 5.2.2 for the Proposed Project. The SCSPA's increased cargo capacity is the most influential factor affecting the Tri-County and state economy in terms of port-related socioeconomic impacts. It is assumed that the socioeconomic impacts predicted by the I-O model would be the same for any of the Action Alternatives as are projected for the Proposed Project in Section 5.2.2.

4.0 Measuring Impact on the Tri-County Region and the State of South Carolina

4.1 Geographic Region

Economic impacts for both the Tri-County Region and the State of South Carolina are projected. The I-O model projects the economic impacts of all the SCSPA port facilities, including the operations in Georgetown and Port Royal. However, the Tri-County projections are indicative of only what employment and economic impacts will be realized within Berkeley, Charleston, and Dorchester Counties. Although impacts from SCSPA port activities are also being experienced outside of the State of South Carolina, these out-of-state impacts were not measured. The defined Tri-County Region and State of South Carolina are sufficiently large to capture the measurable employment and output gains as calculated by the I-O model.

The multiplier or "ripple" effect is reduced, however, when goods and service purchased, or labor resources employed, originated outside the Tri-County Region. It is necessary to estimate this leakage function for the Tri-County Region in evaluating the total impact of the successive rounds of spending in the economy. This estimate is generated by examining the capacity of the local economy to "capture" or to provide the product and labor resources required for construction and manufacturing. The model proportioned the impacts received within the Tri-County Region as a component of the state total.

4.2 Economic Measures

The economic impact on the Tri-County Region and the State of South Carolina consists of employment, income, sales revenues, and taxes. This study reports direct impacts as well as indirect and induced impacts for these four measurements.

The unit of measure most conspicuous in determining the health of an economy is employment. The man or woman earning a wage becomes the catalyst for sustaining the economic engine of the state. Total employment is generated based on the number of persons employed as a result of a port-related activity. The employment measures include direct and indirect effects and include construction, operation, transportation, and manufacturing employment attributed to the SCSPA. Employment refers to the average annual employment on a full-time equivalent basis. Employment figures are estimated for the Tri-County Region and State of South Carolina. Employment is the most important indicator from the perspective of growth and development requirements within the region. It is employment which drives the population growth estimates, generating the most impact in the built environment.

Income resulting from employment is a measure of the support for growth and development that would occur within the region during the analysis period. Income includes the total wages, salaries, and proprietors' income generated in the direct, indirect, and induced categories. The total income is based on employment generated by industry and includes port operations, construction of new facilities, and the manufacturing-based employment attributed to port operations. Wages, in combination with manufacturing and spin off development, would create value within the region, ultimately generating income and real estate taxes to help fund the services and improvements necessary to sustain this level of growth and development along with an acceptable standard of living. Wages received by employees are spent on housing, food, clothing, and other required living expenses. Subsequently, these expenditures serve as income to those providing services to households. Subsequent expenditures continue to multiply as long as they are captured within the region.

Sale revenues are the measure of the value of all firms' sales linked to the SCSPA port activity. Terms used to describe this concept include sales, revenues, or output. In order to define port industry impact, the sale revenues are considered equal to the expenditures on port services required to move goods through the port system. The shipping and cargo handling firms' expenditures are considered equal to the sale revenues received by the port industry firms. Direct sales revenues result from businesses that import or export raw materials, component parts, and finished goods and from transportation firms which ship the cargo to SCSPA facilities. Indirect sales revenues result from the injection of direct sales into the state and local economies through successive rounds of inter-industry and household spending and re-spending.

Commerce through SCSPA facilities generates direct state and local tax benefits. Moreover, state and local governments collect additional tax revenues from businesses and residents whose earnings are indirectly funded by commerce through SCSPA facilities.

The social and socioeconomic EIS sections for the No Action and Action Alternative Alternatives states the employment, sale revenues, income, and tax projections for each alternative.